



The National Orthodox School /Shmaisani

Subject: Science/ Biology

Answer key

Name :

Extra practice : photosynthesis / Limiting Factors

Date:

Grade 8 : all sections

Objective : be able to answer questions about photosynthesis

Question 1 :

A student investigated the effect of different wavelengths of light on the rate of photosynthesis of the water plant, Cabomba.

The student used the apparatus shown in Fig. 6.1.

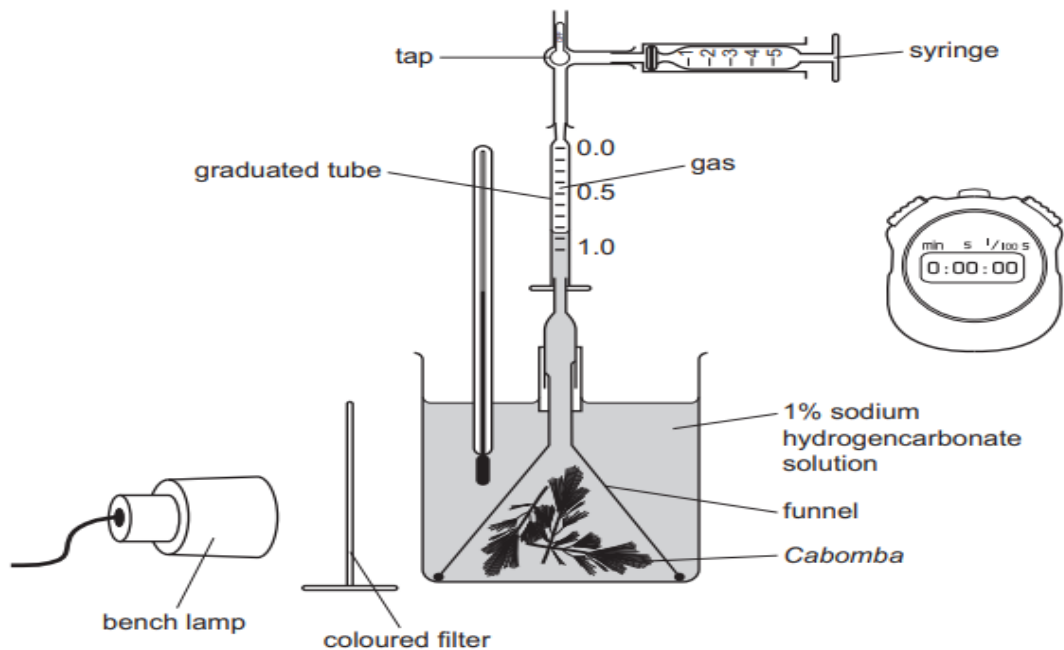


Fig. 6.1

Activ
Go to 1

The student collected the gas produced by the plant for five minutes. The results are shown in Table .



Table 6.1

colour of filter	wavelength of light / nm	volume of gas collected / cm ³
violet	400	0.80
blue	475	0.80
green	550	0.20
yellow	600	0.40
red	675	0.90

- Name the dependent variable **volume of gas**
- Name the independent variable **color of filter** / **wavelength of light**
- Which color of the filter helped to produce the largest volume of gas ? **red**
- State why the student:
 - kept the lamp at the same distance during the investigation.

To control the light intensity / fair test

- Used sodium hydrogen carbonate solution.

To produce carbon dioxide needed for photosynthesis



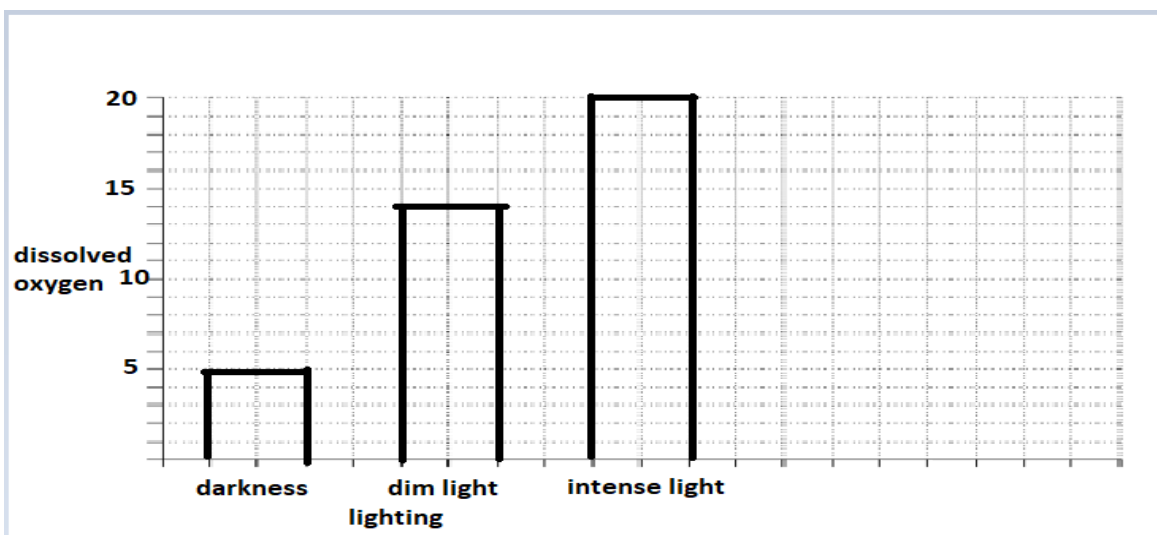
Question 2 :

Three identical beakers of pondweed were left in darkness, dim light, or intense light for an hour .

Then the oxygen in each beaker was measured using an oxygen sensor.

Lighting	Dissolved oxygen (mg/dm ³)
Darkness	5
Dim light	14
Intense light	20

- Name the dependent variable. **Dissolved oxygen**
- Name the independent variable **Lighting**
- Name the controlled variables. **Type of plant , carbon dioxide , amount of water , time**
- Draw a bar graph to show the results .

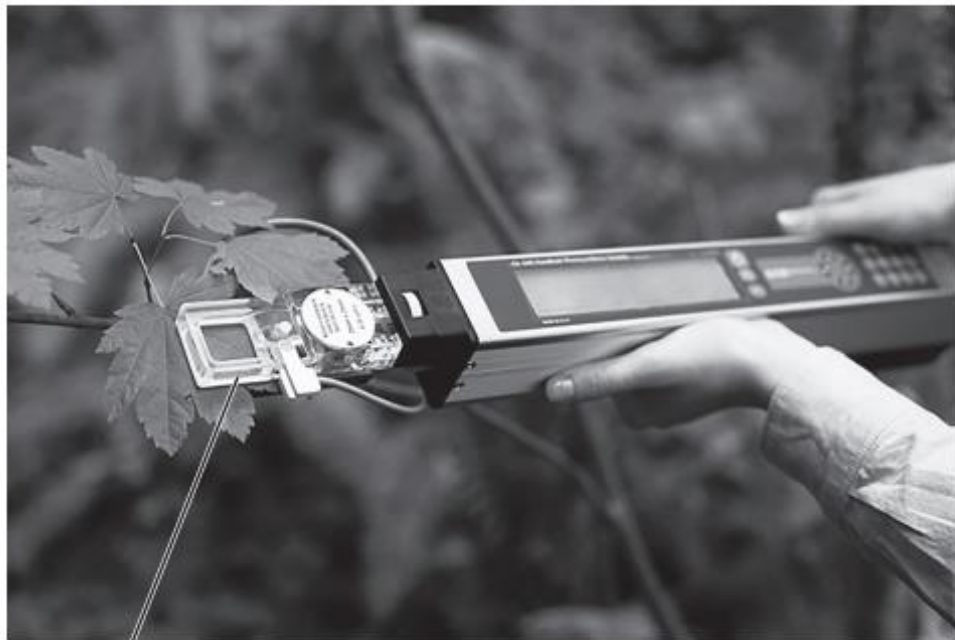




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Question 3 :

The rate of photosynthesis of parts of individual leaves can be measured using a hand-held device as shown.

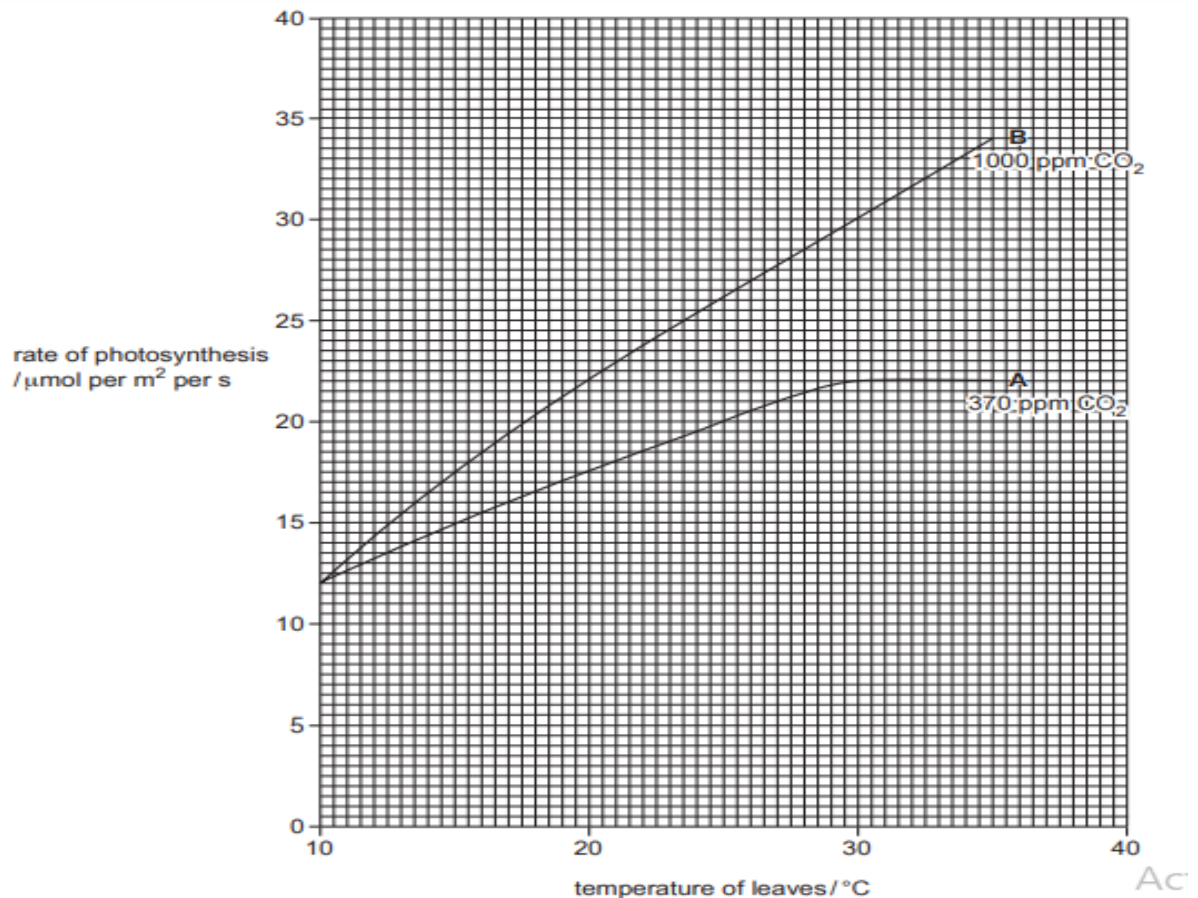


transparent chamber

This apparatus allows air to flow through the transparent chamber that encloses part of the leaf. The apparatus measures the carbon dioxide concentration of the air entering and leaving the chamber.



- a. A student used the apparatus shown above to investigate the effect of temperature on the rate of photosynthesis of the leaves of Chinese plantain, *Plantago asiatica*, at two different concentrations of carbon dioxide, A and B.



- State one environmental factor that should have been kept constant in this investigation.

Light intensity / water

- Describe the effect of temperature on the rate of photosynthesis when carbon dioxide concentration A was supplied.

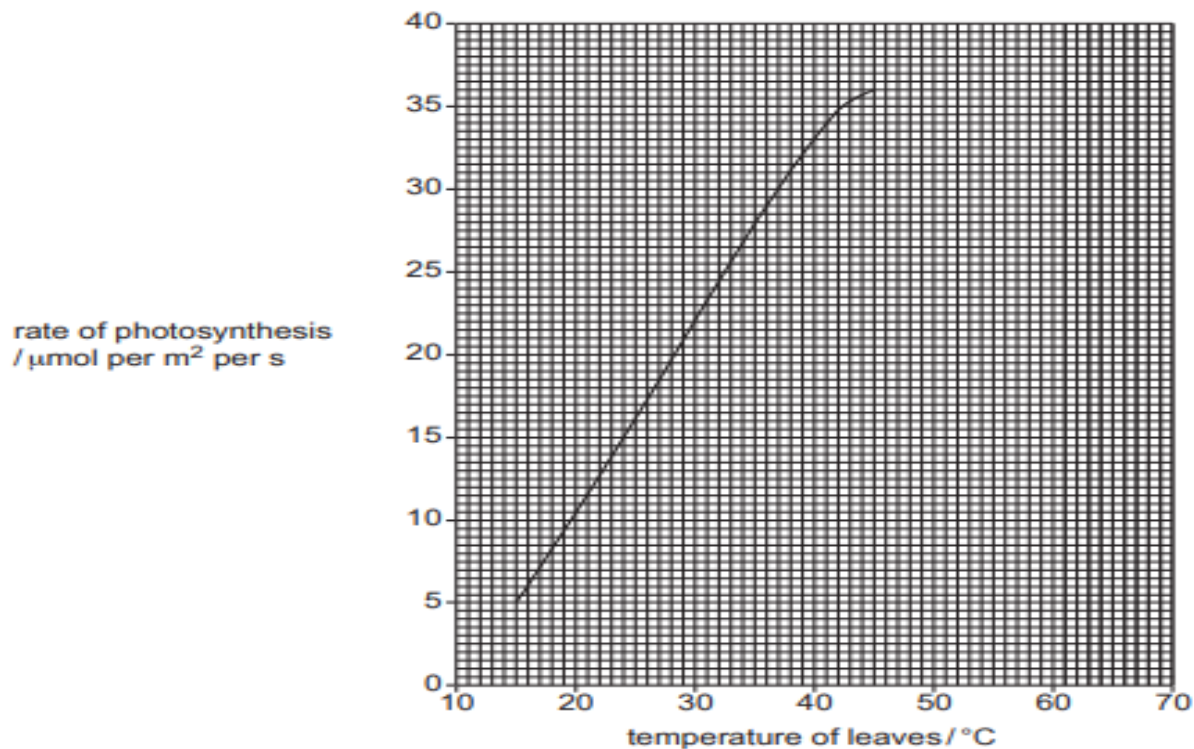
As the temperature increases the rate of photosynthesis increases (between temperatures 10⁰ c and 30⁰c) then it stays constant .



- Explain the effect of increasing temperature on the rate of photosynthesis for carbon dioxide concentration B. Use the term limiting factor in your answer.

Temperature is the limiting factor , increasing the temperature increases the rate of photosynthesis

- b. A similar investigation was carried out on Arizona honeysweet, *Tidestromia oblongifolia*, that grows in Death Valley in California where the highest temperatures may be greater than 45°C.



- Predict and explain what would happen to the rate of photosynthesis if the investigation is continued at temperatures higher than 45°C.

It will slow down enzymes will be denatured due to high temperatures